UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, California

VIA EMAIL AND U.S. MAIL

November 5, 2012

Mr. Edward Modiano
OPOG Project Coordinator
de maximis, inc.
1322 Scott Street, Suite 104
San Diego, CA 92106

Re: Response to Various OPOG Letters Regarding Operable Unit 2
Omega Chemical Corporation Superfund Site, Whittier, CA

Dear Mr. Modiano:

The U.S. Environmental Protection Agency (EPA) is responding to various letters that the Omega Chemical Site PRP Organized Group (OPOG) has sent EPA in recent months regarding Operable Unit 2 at the Omega Chemical Corporation Superfund Site (Site). Specifically, EPA has received the following letters:

- September 16, 2011 letter from you, transmitting Hargis + Associates' (Hargis), review of Operable Unit 2 (OU2) groundwater models;
- April 19, 2012 letter from you, transmitting Hargis' OU2 leading edge evaluation;
- May 4, 2012 letter from you, transmitting OPOG's hydraulic capture assessment;
- May 10, 2012 letter from Jack Keener, regarding the impact of the Waste Disposal Inc. (WDI) site on the OU2 plume;
- May 18, 2012 letter from Gregory Taylor, regarding Capture Zone; and
- September 7, 2012 letter from you, regarding EPA's OU2 Groundwater Monitoring Report for 2010 and 2011.

This letter addresses the main issues OPOG raised in its letters. EPA representatives have discussed many of these issues with OPOG at various times in the past, and some are topics addressed in our letter to you dated January 21, 2010 and in Part 3 (Responsiveness Summary) of the September 2011 OU2 Record of Decision (ROD) for the Site. Accordingly, some of our responses incorporate by reference prior written communications. Rather than restate OPOG's specific issues verbatim, we have summarized them below.

I. In its 9/16/11 letter, OPOG claims that the full extent of the plume is not attributable to the Omega Chemical facility and that EPA made critical, flawed assumptions in its

modeling efforts. Specifically, OPOG claims the model is flawed because EPA assumed that the Omega facility is the only source of Freons 11 and 113 in OU2 groundwater, and that groundwater in OU2 was free from solvent impacts prior to 1976. OPOG also asserts that EPA's models were unreasonable representations of the actual conditions in OU2.

In setting forth our disagreement with OPOG's claims, we first clarify the basis for EPA's conclusions about the extent of OU2 groundwater contamination in the OU2 Remedial Investigation / Feasibility Study (RI/FS) and OU2 ROD. In short, EPA's analysis of the plume is based on extensive sampling results, including groundwater, soil and Hydropunch sampling. To date, EPA has incorporated into its analysis more than 3,000 groundwater samples collected at more than 300 locations within the OU2 area, which were analyzed for 50 or more analytes per sample (>150,000 results total). EPA also considered the hydrogeology of the Site, using lithologic information from over 100 borings and the U.S. Geological Survey's interpretation of stratigraphy (i.e., the layering of soils). Further, EPA gathered and analyzed information about hundreds of industrial entities within or near the OU2 area, a process through which EPA identified several other contaminant source areas.

As EPA documented in the OU2 RI/FS, extensive groundwater sampling has revealed the existence of a single continuous plume of contamination with contaminants of the same type as those found at the Omega facility, generally decreasing in concentration over distance away from that facility. Sampling demonstrates that contaminants from the Omega facility are commingled with contamination released from certain other sources within OU2. The plume from the Omega facility has advanced at an apparent plume expansion rate of at least 540 feet per year (ft/yr), a rate that is consistent with EPA's statistical estimate that the most likely advective velocity for groundwater is 620 ft/yr (Section 6.3.1.1 of the RI). Where sampling and other investigations have shown additional hot spots of groundwater contamination, EPA has identified additional responsible parties.

In addition, EPA's interpretation of the plume and modeling efforts underwent a third party technical review by EPA's Ground Water Technical Support Center, within the EPA Office of Research and Development (ORD). That review, conducted by Dr. Milovan Beljin, and memorialized in a technical memorandum dated September 16, 2011, has been included in the Site Administrative Record. Among other things, ORD concluded that the input parameters of the analytical model (i.e., the plume expansion rate and advective velocity) were reasonable and within the expected range.

To simulate groundwater flow and contaminant migration at OU2, EPA used a numerical groundwater flow and solute transport model. The model was used to aid development and evaluation of alternatives to remediate OU2 contamination. The model was not designed to determine the size of the plume. EPA did not model plume development through a fate and transport model, although solute transport simulations were performed to complement the particle tracking analysis by further evaluating the capability of the model to replicate the contaminant transport history and by further testing the model's capability of simulating the groundwater flow regime at OU2. EPA's model is sound. The plume extent was determined from actual field sampling results and not by numerical modeling. Modeling

efforts were one more tool used to demonstrate how contaminants may have moved through groundwater over time; the plume's size and its distribution of contaminants were ascertained through a completely separate process – i.e., field activities. Thus, we think OPOG's attempts to undermine aspects of EPA's groundwater model miss the mark; the ultimate basis for the plume length was field sampling, not the model.

Freons

OPOG argues there must be other Freon sources in the OU2 area because of the vertical and lateral distribution of Freon in OU2 groundwater; specifically, the center of mass of Freon (vertical plume axis) does not gradually increase in depth with increasing distance from the source, i.e., the Omega facility. OPOG also identifies specific locations where it claims Freon releases have been documented.

EPA responded to OPOG's first point in the Responsiveness Summary in the ROD; see ROD, Part 3, Appendix A, p.2. In summary, groundwater sampling shows a consistent decrease in Freon concentrations away from the Omega property, which is consistent with the property being the sole source of Freons in OU2 groundwater. The Omega plume is very thin owing both to the basin layering (silt layers restrict downward flow) and the small amount of infiltration that occurs within the OU2 area. The classic conceptualization of a plume that is vertically displaced by infiltrated water does not apply to the OU2 area where infiltration accounts for a small fraction of the water budget, the majority being recharge into the spreading basins. Consequently, groundwater at OU2 moves primarily horizontally.

Although EPA welcomes OPOG's efforts to identify other potential sources of Freons in OU2 groundwater, as OPOG is aware, EPA initiated its own search a decade ago for possible sources of Freons other than the Omega facility. As part of EPA's multi-year effort, hundreds of facilities and locations were evaluated. EPA has taken another look at the facilities OPOG has brought to our attention, including OPOG's referenced "NuCar Prep Systems Site" and "Beaumon Property", as well as Weston's reference to sample location "PP058". EPA has already researched and evaluated these locations. EPA currently is not pursuing facilities simply because they may have used Freons, or merely if there is some detectable level in the soil. Although we remain willing to consider information about other alleged sources of contamination in the OU2 area, Freons or otherwise, we have sent special notice letters to facilities only where evidence shows a contribution of contamination from the facility to OU2 groundwater by chemicals exceeding screening levels (such as state or federal maximum contaminant levels), which we recognize could also occur in the future during remedial design or following implementation of the interim remedy for OU2. Any potentially responsible parties (PRPs) identified would be expected to participate in implementation of Site cleanup actions.

OU2 Contamination Prior to 1976

OPOG claims that it was improper for EPA's model to have assumed that OU2 groundwater was free of contamination prior to 1976.

EPA did not assume that the OU2 groundwater was free of all contamination prior to 1976. As noted in the Responsiveness Summary, we agree that Golden State Water Company's (GSWC's) Pioneer and Dace wells are likely capturing contamination from sources other than the former Omega property. In fact, data from the early 1980's show that this is the case, since it is extremely unlikely for the contamination from the former Omega facility to have migrated to this area by then.

The solute transport scenario presented in the RI/FS included only the known major sources of contamination within OU2 in order to keep the modeling simple. The model did not represent any other sources or pre-existing contamination; this is a proper approach for evaluating contaminant transport from the selected sources. The solute transport modeling was performed merely to complement the particle tracking analysis and ultimately showed that the model is able to represent the advective transport of contaminants in the groundwater at OU2. It was only in the limited context of solute transport modeling and for these limited purposes that the model "assumed" there was no contamination in OU2 before 1976. The RI/FS explains this rationale (Section 6.5.3 of the RI) and does not state that groundwater was free of contaminants prior to the release at Omega Chemical.

Modeling "Assumptions"

OPOG claims that EPA biased groundwater transport rates toward the higher end, resulting in simulated plumes that are unrealistically long, by improperly assuming that (1) sorption did not occur; (2) there was instantaneous transport of contaminants from the Omega facility to groundwater; and (3) the models were adequately calibrated.

EPA did not develop the model in order to simulate the size of the plume. The plume size was derived from actual sampling data. The model was developed with the objective of simulating OU2 groundwater flow and to be used as a tool for evaluating the remedial alternatives. The solute transport modeling was performed to show that the model is able to represent the transport of contaminants in the groundwater at OU2 as an additional check of EPA's understanding of the conditions at OU2. The interpretation of the plume extent is based on actual field sampling results. Thus, no amount of disagreement about parameters to the model changes the fact that contaminants from the Omega facility are found 4 ½ miles downgradient.

The numerical modeling results further support the conceptual understanding of groundwater flow and contaminant transport at OU2. The Omega model simulated the groundwater flow conditions at OU2 and the development of the PCE plume during the historical period of operations at the Omega and the Angeles and McKesson facilities (referred to as AMK). EPA's OU2 model simulated the main contaminant transport pathways from Omega and AMK and showed that the simulated contamination from these two source areas has commingled.

The third party review conducted by ORD concluded that the input parameters of the analytical model were reasonable and within the expected range. The memorandum concludes that, "based on the reviewer's more than 30 years of groundwater hydrology

experience, we believe that contamination from the Omega facility could have migrated a distance of 4.5 miles and that the groundwater model is an appropriate tool for the evaluation of the remedial alternatives."

Sorption

EPA did not "assume" that sorption did not occur. Instead, the lack of significant sorption was evidenced by the distribution of the primary contaminants and their degradation products in the actual field sampling. As we noted in our January 10, 2010 letter to you, field data show that there is only minor degradation of the contaminants released at the Omega facility. Contaminants such as PCE and TCE persist and migrate away from the property where the former Omega facility was located. The field data reflect that there are similar migration distances for compounds that have varying sorption capacity. This indicates there is negligible retardation, or sorption, of compounds in the sandy aquifers at OU2. Further, analysis of a set of soil samples collected in 2012 from a boring installed in the downgradient portion of OU2 (CH2M HILL, 2012) shows low organic carbon content. This further supports the interpretation in the RI/FS that sorption is expected to be low.

Consequently, where EPA performed solute transport simulations for the limited purpose of complementing the particle tracking analysis, advection and dispersion were the only solute transport mechanisms represented in the transport model through which EPA further tested the model's ability to simulate the groundwater flow regime at OU2. EPA's rationale for not including other mechanisms is further discussed in the OU2 RI, p. 6-16: "It is expected that the uncertainty in the quantification of the source terms in the model (the duration and magnitude of the contaminant mass flux from sources of groundwater contamination at OU2) have a greater impact on the model results than the effects of sorption and degradation, especially for compounds widely present at OU2 (e.g., PCE)."

EPA's calculation of the minimum apparent plume expansion rate of 540 ft/yr, the minimum speed at which contaminants migrated in groundwater away from the Omega facility, included the effects of sorption, as well as advection, dispersion, and degradation, as discussed in Section 6.3.1.3 of the OU2 RI.

Instantaneous Transport

OPOG states it was improper for EPA to have assumed there was "instantaneous transport" of contaminants from the Omega facility to groundwater.

Again, we note that EPA did not develop the model in order to simulate the size of the plume. The plume size was derived from actual sampling data. The assumption of instantaneous impact to groundwater at the Omega facility was made for the limited purpose of estimating the plume minimum apparent expansion rate and for solute transport modeling. However, even if the vertical transport from surface to groundwater occurred several years after 1976, the contaminants could still have spread over the current extent of OU2.

Moreover, we believe that the concept of quick transport to groundwater is further supported by what is known about historical conditions at the Omega facility. Liquid releases reported to have occurred at the facility were large enough to saturate the soils and would have greatly accelerated vertical migration of contaminants. There were hazardous substances in surface water at the facility during the 1995 removal activities. PCE and TCE were among the substances found in a pool of approximately 1,000 gallons of surface water located near a loading dock at the facility. Hazardous substances in leaking and corroded drums were stored above unpaved floor areas, the asphalt base of which was noted as having been deteriorating more than a decade earlier. There were sumps at the facility that may have served as points of collection for surface runoff. In addition, the vadose zone investigations conducted by OPOG found high VOC concentrations extending southwest from the Omega facility across Putnam Street that indicate a possible transport pathway via a drain or similar conduit, which could have further assisted contaminant spreading through the vadose zone.

In its analysis, ORD also recognized how rapidly contamination can spread vertically, stating "that field experiments conducted at various sites show Dense Nonaqueous Phase Liquids (DNAPLs) can reach a relatively deep water table within several weeks. The margins of error for any of the input parameters used in computing groundwater velocity are sufficiently large to compensate for an assumption of the instant transport from the ground surface to the water table. "

In general, Dr. Beljin's assessment found that the input parameters of EPA's analytical model appear to be reasonable and within the expected range. Further he notes that the rate of infiltration of DNAPLs, such as TCE and PCE, may be extremely rapid due to their low viscosity and high specific gravity.

Calibration

OPOG states that the models do not provide a reasonable approximation of groundwater flow conditions due to a "poor match in vertical gradients". OPOG claims that EPA's parameter estimation modeling technique improperly assumed that observed water levels represented a steady state condition at a given point in time (3rd quarter, 2007) and that, given the dynamic conditions within the groundwater basin, this assumption is flawed because the re-calibrated horizontal hydraulic conductivity array shows relatively large areas where the "calibrated" conductivities exceed the measured range in conductivities. In addition, the distribution of conductivities is not consistent with the conceptual model in that there are very large contrasts over very short distances within respective aquifer model layers. OPOG also claims that EPA should further evaluate a potential inconsistency between its model layering south of Santa Fe Springs anticline and Bulletin 104.

EPA disagrees with OPOG's statement that the models do not provide a reasonable approximation of groundwater flow conditions due to a poor match in vertical gradients. Most of the groundwater flow at OU2 occurs in the horizontal direction as evidenced by contaminant distribution. Vertical head differences exist as evidenced by water levels

measured at monitoring wells. The vertical head differences are not to be confused with vertical gradients, which were not directly measured. The model-simulated vertical head differences are adequate to represent Site conditions.

OPOG's statements about the assumption of steady state misrepresent what was done in the FS. In the RI, the model was calibrated as transient for a simulation period of 30 years. In the FS, the model was recalibrated using additional observations collected since the RI and run as steady state to save computational time and allow use of an automated calibration method. The model was then re-run as transient to confirm the transient calibration. The transient conditions were represented in the FS. The calibration was satisfactory for both the steady state and transient versions of the model. As described in RI section 6.5.3, EPA calibrated groundwater flow, but did not calibrate contaminant transport (see p, 6-16).

EPA disagrees with OPOG's statement that hydraulic conductivities in the model exceed the measured range in conductivities. First, hydraulic conductivities were not "measured" in the field, but were estimated from aquifer tests. The large scale model conductivities are typically higher than conductivities estimated from field tests, which are representative of a small aquifer volume around the test well. The hydraulic conductivities in the calibrated model are similar to the conductivities estimated from aquifer tests at OU2. Furthermore, the model extends outside OU2, i.e., outside the area where aquifer testing was done during the RI. The areas west of OU2 and close to the San Gabriel River contain coarse grained sediments with much higher conductivities than the soils at OU2 and must be assigned higher conductivity values in the model.

The contrasts in hydraulic conductivity within layers are expected for this area. Sharp conductivity changes in the lateral direction owe to the depositional setting, which includes fluvial channels (i.e., high conductivity material) cut into overbank deposits (i.e., low conductivity material). Cross-sections presented in the RI show these changes in lithology (Figure 4-7 of the RI).

EPA has reviewed Bulletin 104, utilized information in that document for the RI, and cited this reference in the RI/FS. In addition to Bulletin 104, the stratigraphic interpretation in the RI/FS is based on oil exploration data not available at the time Bulletin 104 was prepared in 1961. EPA retained the services of USGS to help develop the stratigraphic interpretation. The interpretation is explained in the RI/FS (Section 4.5.2.5, p. 4-9).

II.A. OPOG's 4/19/12 correspondence argues that significant halogenated solvent impacts in the leading edge (LE) of OU2 identified in the mid-1990s cannot realistically be related to the Omega facility, based on data from the CENCO monitoring wells. OPOG argues that sources of contamination other than the Omega facility are responsible for the observed impacts in the LE area.

EPA does not disagree that the first solvent detections in GSWC production wells and in CENCO monitoring wells were in early 1980s and 1990s, respectively, or with the notion that the first arrival of solvents could have been earlier. Nor does EPA disagree that the solvents in the LE area in the mid-1980s likely came from sources other than the Omega

facility. EPA has made consistent statements in the 2011 ROD's Responsiveness Summary and in the RI/FS.

The RI/FS states that the GSWC wells are "likely" impacted by the OU2 plume, meaning that at least some of the contamination found in the Pioneer and Dace wells is likely coming from the OU2 plume. In addition, the wells are likely extracting contamination from other sources in the area as well (i.e., sources outside of the OU2 plume). The well network in this area is not intended to fully characterize sources other than those contributing to the OU2 plume. Historical data show that GSWC first detected contamination in these wells in the early 1980's. The Omega facility began operating in 1976 and is located more than four miles away. It is extremely unlikely that the plume of Omega contaminants could have migrated that distance in that short period of time, between 1976 and early 1980s.

However, for all of the reasons discussed above, EPA disagrees with OPOG's conclusion that contamination from the Omega facility is not responsible for the current observed impacts in the LE area and near the CENCO facility. As explained above, groundwater sampling shows that the Omega contaminants are present continuously throughout OU2 and a high concentration zone extends from the Omega facility past the CENCO refinery into the LE area. These findings strongly support EPA's interpretation that contamination from Omega migrated to the LE area. The possibility of a historical presence of contamination from other sources does not in any way preclude the current observed presence of contamination from the Omega facility.

II.B. OPOG's 4/19/12 correspondence includes time series charts it claims show that solvent VOC concentration trends at the CENCO wells were relatively stable or showed slight decreasing concentrations from the mid-1990s to 2007-2009, trends it argues are consistent with impacts that had already passed through the CENCO well area, rather than indicative of the arrival of a significant plume from a more distant upgradient source.

EPA disagrees with OPOG's conclusion based on these data and believes there are other ways to interpret the CENCO data. The observed temporal trends in the CENCO wells do not mean that a plume must have passed through the CENCO area. These trends could also indicate: that multiple sources with different amounts of contamination released were present at different times throughout OU2; changes (even slight) in groundwater flow direction over time (historical VOC distribution indicates lateral shift of the plume to the west since 1995, see McLaren Hart, 1996); changes in water levels; and/or changes in sampling techniques and analytical methods. All of these factors could have affected the sampling results shown in the time series charts. Although the mid-1990s is 20 years from the start of operations at the Omega Chemical facility and VOC transport over that distance (i.e., between the Omega facility and CENCO well MW-605) within 20 years is plausible,[1] it is more likely that VOCs from other sources at OU2 were detected in the wells in the mid-

[1] The value of 1,000 feet per year would not be an unrealistic contaminant transport velocity, although it is higher than EPA estimated in the OU2 RI.

1990s and that VOCs from the Omega facility arrived later. All these data and information do not change the conclusion that a continuous VOC plume extends from the former Omega property through this area.

III.A. In its May 4, 2012 letter, OPOG asserts that groundwater simulations performed by its consultant create a reasonable case that recharge practices in the San Gabriel spreading basins contributed to solvent contamination in OU2 groundwater, because a reasonable conclusion from the modeling and EPA's historical analysis would be that the spreading basins are a source of chlorinated solvents that could have caused the historical low concentrations of chlorinated solvents at both the Pioneer and Dace water supply wells, and could potentially impact the proposed OU2 remediation wells.

EPA does not disagree that past discharges of VOC contaminated water in the spreading basins could account for the presence of solvents throughout the Central Basin. EPA disagrees that the spreading basins have contributed identifiable contamination to the OU2 plume; EPA is not aware of any substantial evidence showing that contamination from the spreading basins has contributed to the OU2 plume. EPA's extensive investigations indicate clearly that OU2 is a continuous plume of contaminants that does not extend further west towards the San Gabriel River and the spreading basins than that which is indicated in the RI/FS (see Figure 1-5 from the RI/FS). The direction of the groundwater flow in the Central Basin area of the spreading basins is generally south/southwest (see Figure 4-6 from the RI/FS). Consequently, for the spreading basins to have contributed to the OU2 plume, groundwater from the basins would have to flow in a direction contrary to what current groundwater flow conditions indicate.

Further, the spreading basins are located approximately 3.5 miles away from the GSWC wells and approximately 2.9 miles away from the CENCO wells. For contamination to have reached the GSWC production wells in the 1980s and the CENCO monitoring wells in the 1990's (in addition to flowing in a direction contrary to what current groundwater flow conditions indicate), the contaminated wastewater recharged to the spreading basins in 1960s-1970s would have to have a transport velocity greater than the 620 feet per year that has been estimated for the OU2 area.

EPA has provided OPOG with all model inputs from our modeling effort to allow for performing modeling runs. EPA, however, has not evaluated OPOG's model.[2] Although OPOG provided EPA with model input files, no report documenting the OPOG modeling efforts or specific data or analyses of data in this area have been provided. If OPOG obtains information specifically pertaining to the treated wastewater effluents in the San Gabriel spreading basins, rather than to the general nationwide study conducted by EPA in the 1980's, EPA remains receptive to reviewing it.

III.B. OPOG argues that the capture zones of the OU2 interim remedy would extend significantly outside the OU2 boundary, where there are many sources of PCE and other

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[2] Rather than use EPA's FEFLOW input files and run simulations using EPA's model, OPOG built a new model with different software (MODFLOW) and a different numerical method.

plume constituents of concern, which demonstrates that EPA has not matched its identification of potential source areas with the capture zone of the proposed OU2 remediation wells. OPOG states that EPA should consider installing additional groundwater monitoring wells or perform other analysis to better evaluate the impact of the spreading basins on the OU2 plume.

A capture zone analysis will be done at the time of the design of the OU2 groundwater extraction and treatment system selected in EPA's OU2 ROD. During design, the extraction system can be optimized to limit the amount of water captured from outside the OU2 plume, with the goal being to contain the OU2 plume in a way that does not draw in or otherwise mobilize any outside contamination, if any exists. EPA does not disagree that there may be some capture of groundwater outside of the current OU2 boundary, although this in no way means contamination necessarily will be captured. If future data show that contamination is being pulled into the plume, EPA will consider whether to take additional enforcement action against any additional parties, and will work with the State to fashion an appropriate response at such time. Additional monitoring wells will be installed as part of the interim OU2 remedy; this monitoring network may include wells to the west of OU2. EPA will also support using groundwater monitoring data from other facilities located within and outside of OU2 to assist in evaluation of the remedy performance.

IV.A. In its May 10, 2012 letter, OPOG raises a number of issues regarding EPA's investigation of the OU2 plume in the area of the WDI site. OPOG claims there are gaps in data relating to the WDI site, and that substantial evidence exists to support the WDI site's contribution to OU2 contamination.

We disagree that there is substantial evidence showing a contribution of contaminants from the WDI site to OU2 groundwater, although we acknowledge that the eastern edge of the OU2 plume could be characterized in more detail. EPA expects that additional plume characterization along the eastern edge of OU2 will be performed during remedial design, to further define the extent of contamination and to ensure the proposed interim treatment system is properly designed to contain the plume.

OPOG's letter refers to EPA's identification of the WDI site as a source of contamination in the OU2 ROD. We seek to clarify that EPA did not identify the WDI site as a source in its ROD, which does not make determinations as to which parties are liable and should implement or pay for the selected remedy. Figure 3 of the ROD was intended only to illustrate the various locations that were discussed in EPA's OU2 RI Report (Sections 5.4 and 5.5), many of which are not confirmed sources of contamination to the OU2 plume.

EPA has notified parties of their liability with respect to the Omega Site where evidence shows a history of use and contribution of contaminants from the facility to OU2 groundwater. It is possible that additional areas contributing contamination to the OU2 plume will be identified, for example, during remedial design. Any PRPs identified would be expected to participate in implementation of the OU2 interim remedy.

IV.B. OPOG argues that EPA's "closure" of the 5 µg/L contours in the OU2 RI report upgradient of the WDI site is unsupported due to a lack of monitoring wells in this area, and

that EPA relied heavily on CENCO wells that are inadequate due to the elevated levels of petroleum hydrocarbons. OPOG argues that there is a need for reevaluation of various aspects of the WDI site, and that there are inconsistencies in EPA's analysis.

The overall OU2 contour was based on an extensive data set, and did not rely heavily on the downgradient CENCO wells. EPA's OU2 RI Report did include a review of data from the WDI site, noting that PCE was detected at deeper wells at the WDI site. Page 5-34. The RI concluded that this zone of PCE contamination, downgradient of well MW18, appeared to be separate from the OU2 plume. The RI did not make a determination about the source of this contamination, stating "There may be a local source in this area, but it may also be a continuation of the contamination found at Well MW18."

We do not agree that there have been significant inconsistencies between EPA's technical analysis and conclusions on WDI and the OU2 plume. We think the OU2 RI is consistent with other statements to which OPOG refers in its letters (e.g., "the [WDI] Site cannot be eliminated as a potential source..."). The OU2 RI's reference to the lack of evidence that the WDI site contributed to the exceedance of any groundwater standards is taken from the WDI ROD, and it is further supported by the September 4, 2009 WDI site Five-Year Review (p. 21), which stated that there is no indication that waste materials from the WDI site have caused exceedances of groundwater standards. Although the WDI remedial action did not address groundwater as a contaminated media due to this lack of evidence, there were investigations of groundwater at the WDI site, and the remedial action includes long-term groundwater monitoring to ensure protectiveness, to detect possible future changes in the groundwater conditions, and to determine if the site might cause exceedances in contaminant standards. As noted above, we expect that the extent of contamination along the eastern edge of the OU2 plume (including PCE and TCE contamination) will be more fully assessed during remedial design.

In response to OPOG's request for additional information regarding the WDI site, EPA will provide a DVD containing the WDI groundwater database, groundwater monitoring reports and the September 4, 2009 Five Year Review for the site. This information will be sent to you under separate cover.

V.A. In its 9/07/12 letter, OPOG claims PCE and TCE concentrations trends are decreasing in the downgradient (or leading-edge) portion of the plume, in wells MW28, MW29, and MW30, and therefore extraction and treatment in this area is not necessary and monitored natural attenuation (MNA) would be sufficient.

EPA disagrees with OPOG's interpretation that the groundwater data shows decreasing trends. A statistical trend analysis of the data by the Mann-Kendall test is included in each of the annual groundwater reports (Appendix H). Table 3-5 of the Groundwater Monitoring Report for 2010 and 2011 shows that none of the detected compounds has a decreasing trend in these three wells (MW28, MW29, and MW30). The previous report, for 2008-2009, also did not detect decreasing concentration trends in these wells. In addition, sampling data indicate that contamination in the LE portion of the plume appears to have impacted downgradient drinking water wells and contaminated groundwater is likely being drawn into deeper aquifer units. Thus, MNA would not be an appropriate or effective remediation

approach. MNA was not considered as a remedial option in the OU2 FS since it would not meet the primary goals, or Remedial Action Objectives (RAO) developed for the interim remedy, which are:

- Prevent unacceptable human exposure to groundwater contaminated by contaminants of concern (COCs);
- Prevent lateral and vertical spreading of COCs in groundwater at OU2 to protect current and future uses of groundwater; and
- Prevent lateral and vertical migration of groundwater with high concentrations of COCs into zones with currently lower concentrations of COCs to optimize the treatment of extracted groundwater.

V.B. OPOG argues that the migration of contaminants from upgradient areas may be occurring at considerably slower rates than postulated in the OU2 RI/FS.

EPA disagrees and is not aware of any evidence indicating that contaminant migration in upgradient areas of OU2 is slowing. OPOG has not presented technical arguments to support this assertion. The data collected to date do not indicate slower migration of contaminants, which would only be expected if groundwater gradients decreased. Contaminant mass flux density is expected to gradually decrease in the northern part of OU2 as a result of the operation of source control systems at the Omega and McKesson facilities, as these systems prevent further contaminant mass from entering the OU2 aquifer. Contaminant migration at OU2 would be best assessed using a numerical solute transport model that accounts for all known sources and groundwater conditions throughout the OU2 area. Groundwater monitoring at OU2 will continue before and during the interim remedy's operation, and the groundwater analytical results could be used as an observation data set for the calibration of a numerical model in the future. While solute transport modeling would better characterize contaminant migration and provide an improved understanding of contaminant migration, the outcome of these efforts would not change the selected interim remedy which is to contain the contamination. However, this evaluation is expected to be useful for the selection of the final remedy for OU2, specifically for assessing cleanup target concentrations and prioritizing source area cleanup actions.

V.C. OPOG argues that the PCE and TCE plumes retracted from their extent in 2007. The PCE plume, as depicted by the 5 µg/L contour, has retracted approximately 1,500 feet north from 2007 to 2011. The 2007 plume was based on monitoring well and Hydropunch data, and the 2011 plume on monitoring well data only. None of the COC plumes have expanded and additional COCs have retracted since 2007.

EPA disagrees with OPOG's claim that the OU2 plume is retracting. In a retracting plume, wells near the plume edges would exhibit decreasing temporal concentration trends and this is not the case. These conclusions may change in the future as continued monitoring will provide longer term observations.

As OPOG correctly stated, the 2007 plume was based on monitoring well and Hydropunch data, and the 2011 plume is based on monitoring well data from 2011 only. The apparent retraction of the plume is an artifact of the smaller data set. The plume maps shown in the Groundwater Monitoring Report for 2010 and 2011 show contours of the concentrations measured in samples collected from monitoring wells in 2011, without including all historical data. Inclusion of the Hydropunch samples collected between 2001 and 2007 on the 2008-2011 maps would result in plumes approximately the same size as the 2007 plume; however, we think such mixing of current and historical data is not appropriate. Comparison of the 5 µg/L contours on the 2007 maps and contours on later plume maps that utilize a different set of data is not appropriate as the old data would obscure the changes in the contaminant distribution from one monitoring event to the next.

There is no basis for concluding that the plumes have retracted since 2007. EPA expects that additional monitoring wells will be installed to monitor the performance of the interim remedy. Some of these monitoring wells will need to be screened in the shallow groundwater and Hydropunch (or similar) sampling could be utilized for optimal placement of the wells, especially in the areas along the plume edges. These additional wells will increase the amount of data that will be used for drawing plume contours in the future. Increased information during the remedial action will provide a larger set of data and help further characterize the plume.

V.D. OPOG argues the 5 µg/l contour for PCE in 2011 could be drawn farther north of the leading edge and the distance from the 2007 contour would be about 2,500 feet.

EPA believes that the contour as shown is more accurate than what OPOG suggests. As the figure legend says, the extent of PCE is "estimated". The leading edge shown by the 5 ug/L contour in Figure 3-6c of the Groundwater Monitoring Report for 2010 and 2011 (CH2M HILL, 2012) is drawn approximately two-thirds of the distance from CENCO-MW-710 with concentration 55 µg/L PCE to MW29 with concentration 0.34J µg/L PCE. Please note that 5 µg/L is closer to the concentration detected in MW29, and the 5 µg/L contour could have been drawn farther south (closer to MW29). Experience from OU2 and other groundwater sites shows that concentrations in groundwater tend to decrease toward the leading edge of a plume; i.e., it is very unlikely that PCE concentrations sharply decrease from 55 µg/L at CENCO-MW-710 to below 5 µg/L over a short distance. Also, it is important to keep in mind that groundwater analyses are simply one data point at one point in time, and variations in data are likely to exist.

V.E. OPOG argues that TCE plume has retracted north by about 2,000 feet from 2007 to 2011. Similar to PCE, the 5 µg/l contour for 2011 could be drawn farther north, about 3,000 feet from the 2007 contour.

As stated above, the figure legend says, the extent of TCE is "estimated". The leading edge shown by the 5 µg/L contour in Figure 3-7c of the Groundwater Monitoring Report for 2010 and 2011 (CH2M HILL, 2012) is between MW29 with TCE concentrations of 0.52 µg/L, CENCO-W-14B with TCE concentration 9.7 µg/L , and CENCO-MW-710 with TCE concentration 93 µg/L.

V.F. OPOG states that EPA's conclusion on Omega's contribution to the OU2 plume in the 2010 RI/FS was "highly dependent" on Hydropunch samples.

EPA disagrees with OPOG's characterization of the role of Hydropunch samples in EPA's assessment of the former Omega facility's contribution to the OU2 plume. As discussed in further detail in Section I above, EPA's analysis of Omega's contribution is based on extensive sampling results, including groundwater, soil and Hydropunch sampling, including more than 3,000 groundwater samples collected at more than 300 locations across OU2.

As EPA documented in the OU2 RI/FS, extensive groundwater sampling has revealed the existence of a single continuous plume of contamination with contaminants of the same type as those found at the Omega facility, generally decreasing in concentration over distance away from the facility. EPA will require the installation of additional wells for the design and performance monitoring of the interim remedy, and will encourage parties implementing the interim remedy to use Hydropunch sampling as a tool assisting with the optimum placement of the new wells.

V.G. Review of the 2007 through 2011 data clearly support the premise that the Omega plume never reached MW28, MW29, or MW30.

EPA disagrees. The Omega COCs have been detected in these wells since the three wells were installed and sampled in 2007. The detected (2010-2011) compounds include MTBE, 1,2-DCA, TCE, and cis-1,2-DCE which is the degradation product of PCE and TCE. Please see our responses in Section I, regarding the extent of the OU2 plume and Omega Chemical's contribution to the contamination in groundwater.

V.H. OPOG claims that the vertical distribution of PCE along cross-section CC' demonstrates that the plume has attenuated from 2007 to 2011, especially at MW27.

EPA disagrees. Table 3-5 of the Groundwater Monitoring Report for 2010 and 2011 (CH2M HILL, 2012) shows that COC concentrations have no trends at wells MW27A, MW27B, and MW27D, while PCE, TCE, and 1,2-cisDCE have increasing trends at MW27C. The cross-section plot does not demonstrate attenuation of the PCE plume; it does not show any trends, it only shows a snapshot of the PCE distribution in time, i.e., first quarter 2011. Several wells, namely MW27, are located within a narrow, high concentration zone that is continuous throughout OU2 and demonstrates a major contaminant transport pathway (see, for example, Figures 3-6 and 3-7 of the report). Also, it is important to keep in mind that temporal variations in groundwater analytical data are likely to exist. Variability such as slight lateral shifts in groundwater flow direction (which have been documented at OU2 on small scale) could cause localized temporal variability in contaminant concentrations in samples from these wells. During remedial design, additional wells will provide a larger set of data and help further characterize and monitor the plume.

V. I. OPOG states that groundwater flow contours suggest that contamination from the Ashland facility could merge with the OU2 plume.

Additional groundwater monitoring wells may be needed to investigate the extent of contamination from Ashland and whether it has merged or could merge with the OU2 plume; the wells could be installed as part of remedial design investigation. Please note that a groundwater extraction and treatment system, installed as a source control measure, operates at the Ashland facility.

If you have any questions regarding the above, please contact Lynda Deschambault, Superfund Remedial Project Manager at (415) 947-4183 or deschambault.lynda@epa.gov.

Sincerely,

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